

BUILDING
ENERGY EFFICIENCY



Improving Building Efficiency with
the Green Mark Scheme

SINGAPORE

SINGAPORE FINDS SUCCESS



Green buildings lead emissions reduction strategy

Singapore is a small and densely populated city-state. With limited fossil and renewable energy sources, energy efficiency forms a core part of Singapore's energy and climate strategy. Singapore pledged to reduce its greenhouse gas emissions by 16 percent below business as usual levels in 2020, under the UN Framework Convention on Climate Change. The reductions focus on the building sector, which is expected to contribute 13.8 per cent of 2020 emission levels, due to increasing demand for commercial space and more intensive use of space.¹ In 2009, Singapore set a goal to improve its energy intensity by 35 percent from 2005 levels by 2030.²

GREEN BUILDING CERTIFICATION AT CORE OF MASTER PLAN

In response to Singapore's economy-wide emission reduction goals, the Building and Construction Authority set a national target of greening least 80 percent of the country's buildings by 2030. To meet this target, Singapore's 2nd Green Building Master Plan, a roadmap to achieve sustainability, initiated six "strategic thrusts." These were designed to demonstrate public sector leadership and spur the private sector towards green buildings, promote research and development into green building technologies, build industry capability and impose mandatory minimum environmental standards.³

The Green Mark Scheme is the central pillar of the plan. First launched in 2005, the Green Mark Scheme rates the environmental impact and performance of buildings based on internationally-recognized best practices. It covers new and existing buildings (residential and non-residential), as well as public parks, office interiors and infrastructure. Four levels of certification include Green Mark Certified, Gold, Gold Plus and Platinum. Buildings are certified to one of these levels based on five categories for assessment of their energy and water efficiency, environmental protection, indoor environmental quality and other innovative features that contribute to building performance.

The Green Mark program awards points for incorporating specified design features or practices listed under each of the five categories, with a greater weighting towards energy efficiency, and the total score determines the certification level awarded. A Platinum building can achieve more than 30 percent energy savings compared to a building that is merely code compliant, for example. Certified

buildings are required to be re-assessed every three years to maintain their Green Mark status, and minimum standards are regularly reviewed and tightened.⁴

Participation in the Green Mark Scheme is voluntary for existing buildings in the private sector. However, a 2008 regulation requires all new buildings and all existing buildings undergoing major retrofitting to meet at least the minimum Green Mark standards, which are 28 percent higher than 2005 building codes.⁵ The public sector is held to higher requirements. All new public buildings must achieve Platinum rating, and all existing buildings with a minimum air conditioned floor area must achieve Gold Plus rating by 2020. Achievement of higher Green Mark ratings is also a land-sales condition in key growth areas.⁶

To reduce the costs for private sector building owners and developers and to promote green buildings, the government has set aside about USD 102 million worth of cash incentives for the private sector and USD 46 million for green building research and development to be used for a number of programs as described in Figure 1.⁷

Figure 1: Government Incentives to Promote Green Buildings in Singapore

INCENTIVE	AMOUNT	PURPOSE
Green Mark Incentive Scheme for New Buildings	USD 15.7 million	Rewards new developments that achieve a Gold rating or higher by co-funding up to USD 2.4 million of the cost for private developers and owners. It also offers an incentive of up to USD 78,000 for architects and engineers involved in public or private developments.
Green Mark Incentive Scheme for Existing Buildings	USD 78.7 million	Co-funds up to 35 percent of the retrofitting costs for energy efficiency improvements, or up to USD 1.2 million, whichever is lower.
Building Retrofit Energy Efficiency Financing Pilot Scheme	USD 3.9 million	The Building and Construction Authority will share the risk of any loan default with participating financial institutions that provide loans to building owners and energy services companies to carry out green retrofits.
Green Mark Gross Floor Area Incentive Scheme	N/A	Grants additional floor area (space at a premium in Singapore) for developments attaining Gold Plus or Platinum rating.
Green Mark Incentive Scheme for Design Prototype	USD 3.9 million	Encourages the design of breakthrough prototypes that can achieve results exceeding Platinum through adoption of an early collaborative design process.
Research Fund for the Built Environment	USD 39.3 million	Provides funding support for academia and industry to undertake green building and sustainability related research projects. To date, USD 14.2 million has been committed to support more than 30 research projects.
Grant Call for R&D Proposals in Green Building Technologies	USD 7.1 million	Fosters public-private collaboration in green building research. The Grant Call has been awarded to nine research projects in the area of energy efficiency and building materials.

Source: Adapted from the Building and Construction Authority, Singapore, and the National Climate Change Secretariat, Singapore.

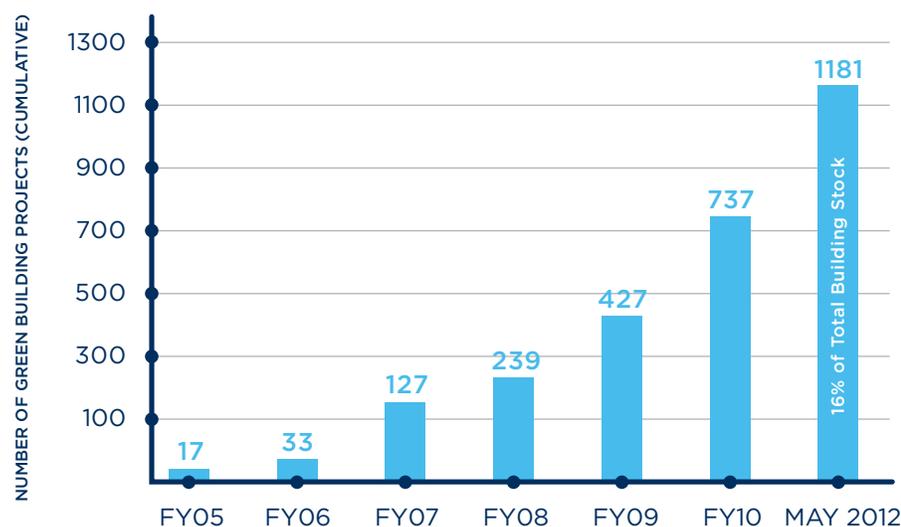
Job training is also part of Singapore’s path to emissions reductions. Within the next 10 years, the Building and Construction Authority is planning to train 20,000 green specialists through the Building and Construction Authority Academy as it strengthens the industry’s capability in the design of green building systems as well as the downstream construction and maintenance of green buildings.⁸

Singapore is home to South-East Asia's first Zero Energy Building, which was retrofitted from an existing building and serves as a test-bed center for green building technologies.⁹ The country also collaborates with international partners such as the United Nations Environment Program to promote and build capacity for sustainable buildings policy development in Asia through the Building and Construction Authority Center for Sustainable Buildings.¹⁰

ECONOMIC BENEFITS INFLUENCE DEVELOPERS

Singapore is making steady progress on its target of 80 percent Green Mark buildings. In May 2012, one-sixth of Singapore's total building stock earned a green designation. (Figure 2.) Approximately 10 percent of those achieved a Platinum rating.

Figure 2: Progress Toward 80% Green Buildings Target



Source: Anggadajaja, Edward.

While the government has supported the Green Mark Scheme, building owners and developers embrace it too, because it offers a number of economic benefits. The modest increase in design and construction costs for a Green Mark-compliant building are offset by energy and water savings. Increased building costs range from a less than one percent premium for Green Mark Certified to up to 8 percent premium for Platinum levels. The average payback period is relatively short, ranging from two to eight years, because of the significant energy and water cost savings due to reduced consumption.¹¹ The Green Mark Scheme helps differentiate the buildings in the real estate market, enhancing corporate image and increasing leasing and resale value of buildings.

A recent study by the National University of Singapore found that green buildings save approximately 10 percent in operating expenses, and green commercial buildings increase in market value by about two percent. The average savings from 23 buildings (comprising office, retail, hotel, and mixed-used developments) sampled after retrofitting was about 17 per cent of the total building's energy consumption, compared to before retrofitting.¹²

In addition to the economic benefits, Green Mark buildings offer reduced environmental impact and improved building quality for healthy and productive homes and workplaces. More detailed analysis on the impact of the Green Mark Scheme is underway.

In December 2011, Singapore firmly established its status at the forefront of sustainable building design and construction. The World Green Building Council Government Leadership Awards recognized Singapore's Building and Construction Authority with a Regional Leadership Award for its exceptional Green Building Master Plan, including the flagship Green Mark Scheme.¹³ A strong regulatory framework, robust market incentives and a culture of corporate responsibility all contributed to Singapore's success, as well as the government taking an active role in promoting research and development of green technologies.¹⁴

Singapore's green building journey serves as one of the success stories for countries striving towards a sustainable built environment. The Aspen Institute's Energy and Environment Awards recognized Singapore's approach as innovative, scalable and replicable.

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ENDNOTES

Note: currencies were converted to US dollars on July 10, 2012 at the exchange rate of 1 USD = 1.27 SGD.

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- ¹² Tan, Mindy. "Green buildings make value proposition." The Business Times, November 29, 2011. Web. June 2012. <<http://www.eco-business.com/news/green-buildings-make-value-propositions/>>
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Figure References

Figure 1: Government Incentives to Promote Green Buildings in Singapore

Adapted from the Building and Construction Authority, Singapore, and the National Climate Change Secretariat, Singapore.

Figure 2: Progress Toward 80% Green Buildings Target

Anggadaja, Edward. "Singapore's Green Building Story: Innovative, Scalable & Replicable Innovative, Scalable & Replicable." Singapore Building and Construction Authority presentation at the Asia Clean Energy Forum, June 8, 2012. Web. June 2012. <<http://www.scribd.com/doc/97619115/Edward-Anggadaja-Singapore%E2%80%99s-Green-Building-Story-Innovative-Scalable-Replicable>>